

Statistics - objectives, motivation, purpose & important terms

BEA140 Quantitative Methods - Module 2



Module 2 Objectives

The objectives of module 2 are for you to obtain:

- an awareness of the value that statistics as a discipline plays in business environments;
- exposure to an overview of data collection and the properties of data;
- the ability to obtain and interpret various descriptive techniques that can provide and communicate an improved understanding of data sets;
- exposure to a number of graphical and tabular techniques for describing data;
- exposure to discussion and examples of various measures of central tendency and dispersion for raw data, and for both samples & populations. Including the ability to calculate, interpret and discuss these measures;
- exposure to discussion and examples of various measures of central tendency and dispersion for grouped data. Including the ability to calculate, interpret and discuss these measures;
- exposure to discussion and examples of “shape”;

Module 2 Objectives

- exposure to an introduction to regression and correlation as descriptive tools, including: basic terminology and symbols used, the role of scattergrams, LS line of best fit, standard error, and cautions of causation;
- an awareness of the three forms of deviation considered when looking at the coefficient of determination;
- the ability to calculate, interpret and discuss: the standard error of the estimate, coefficient of determination and the correlation coefficient; and
- the ability to sanity/reality check values that you calculate yourself or come across through other sources.

Why do business students need statistics?

Essentially the answer revolves around the concepts of variation and uncertainty. In almost all business environments, and in any business discipline, variation and uncertainty will lessen the effectiveness of decision making and communications.

Practically every characteristic of interest will vary, whether it be from individual to individual, case to case, time to time, and so on. For example height, weight, blood type, IQ, income, production level, number of defects, daily sales, number of outstanding accounts, rainfall, maximum temperature, life expectancy, gender, religion, and so on (the possible examples are endless).

Because such variations cannot be predicted in advance (with 100% accuracy), we are left uncertain when making many decisions. Statistics is a discipline that provides us with tools to extract information about variation and uncertainty, and also provides a reasonably clear understanding of the limitations that the information extracted have for government/company policies, predictions, decision making and so on.

Where statistics is commonly used

- management accounting - identification and quantification of cost drivers and activity bases;
- financial accounting - presentation techniques for financial reporting;
- auditing - sample selection procedures;
- marketing - product demand forecasting, market segmentation;
- customer service - customer satisfaction measurement;
- production management - quality control, benchmarking;
- human resource management - staff satisfaction and motivation studies, recruiting and planning in large companies;
- stock control - inventory modelling (stock planning);
- economics - econometrics, economic forecasting;
- insurance - compiling and interpreting life tables; and
- finance - risk in financial markets, the “security market line”.

Components of statistics

- **Design**: - nature of data, procedures for gathering/collecting data (what data is and how we get data - module 2);
- **Description**: (i.e. descriptive statistics) - summarising, reporting features, characterising data, communicating information. Includes the use of graphical, tabular and summary measure approaches at drawing information and conclusions (how we describe data - module 2); and
- **Inference**: (i.e. inferential statistics) - making valid generalisations (about population characteristics) or decisions concerning a population on the basis of samples (what we do with data - covered in module 4 as it also requires knowledge of probability concepts).

Some important terms

- **Population**: collection of all items/things being considered. E.g. all people in Australia, all students, all people over the age of 55. Note the size of a population may be finite or infinite (observations may be continually generated);
- **Parameter**: a summary measure of a population, often represented by Greek letters (e.g. μ , σ , etc.);
- **Sample**: a portion of the population selected for analysis (samples are often selected for analysis because measuring the whole population, i.e. taking a census, is too expensive, too difficult, not possible etc.); and
- **Statistic**: a summary measure of a sample, often represented by Roman letters (e.g. s , r , etc.).

Where can statistics help?

Business managers may find themselves seeking answers to questions like:

- If we play Hawaiian music in the background, will our factory workers be more productive?
- What proportion of our customers are dissatisfied with our service?
- What is our market share in the Melbourne widget market?
- How many new passenger vehicles are registered each year in Tasmania?
- What proportion of our consultants know the correct process for handling a complaint? What proportion follow the correct process?

All of which are legitimate questions that could provide useful input to significant decisions, but are also likely to require data that is not available at your fingertips.

...that's it for now!